



Infrastructure · Water · Environment · Buildings

Mr. James Hou
United States Environmental Protection Agency - Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-8960

Subject:

Pilot Test Work Plan Addendum No. III

Chevron Orlando Superfund Site
Orlando, Florida

Dear Mr. Hou:

On behalf of Chevron Environmental Management Company (Chevron EMC), ARCADIS U.S., Inc. (ARCADIS) has prepared this *Pilot Test Work Plan Addendum III* (Work Plan Addendum No. III) for the former Chevron Chemical Company facility located in Orlando, Florida (Chevron property) (Figure 1). The original *Pilot Test Work Plan* (Work Plan) dated November 9, 2006 was approved by the United States Environmental Protection Agency (USEPA) in their letter dated October 25, 2006 and electronic mail transmitted on November 13, 2006. Since then, two work plan addendums have been submitted and approved by the USEPA in 2007 and 2009. These addendums were developed to address changes in the Conceptual Site Model and to evaluate an alternative supplement delivery method.

The objective of this Work Plan Addendum is to expand the existing treatment zone constructed at the Lake Fairview Commerce Center (Commerce Center) along a line formed by wells MW-48D, MW-47D, and MW-29D (Figure 2) and construct a new treatment zone at the Chevron property. ARCADIS believes that expansion of the treatment zone at the Commerce Center is warranted based on the elevated chlorinated pesticides (BHCs) concentrations detected in wells MW-1D, MW-32D, and MW-49D. These three wells form a migration pathway that passes to the north of the existing treatment zone. In addition, ARCADIS believes that construction of a treatment zone at the Chevron property would supplement the remedial actions proposed in the *Revised Source Reduction Work Plan* dated January 31, 2011.

The following sections summarize the general approach, existing treatment zone construction and performance, and proposed treatment zone expansion and construction.

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B0046727.0000.00006



General Pilot Test

The pilot test is evaluating the feasibility of using EHC™ to promote reductive dechlorination of BHCs. EHC™ is a combination of a food-based carbon source and zero-valent iron (ZVI). The primary performance indicator is the BHC concentrations in groundwater. Since enhanced reducing conditions promote the dechlorination of the BHCs, increases in the total organic carbon (TOC) concentrations and decreases in the oxidation/reduction potential (ORP) in the groundwater adjacent and downgradient of the permeable reactive barriers (PRBs) are also positive indicators.

Work Plan Addendum II

In Work Plan Addendum II, ARCADIS proposed the use of an alternative delivery method for the placement of EHC™. The original delivery method used steel rods advanced with a direct-push rig and the introduction of the EHC™ under pressure. This original method posed many physical challenges associated with trying to keep the iron filings (ZVI) suspended and minimize clogging of the injection tips. In addition, the EHC™ could not be evenly distributed because of preferential pathways along each borehole. The alternative method involved the backfilling of open boreholes with EHC™. The alternative method allowed the placement of the EHC™ in an efficient and effective (even distribution) manner. WP II -
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In April and November 2009, a total of 28 borings were used to construct the existing treatment zone at the Commerce Center (Figure 3) between wells MW-48D and MW-47D. Each boring was advanced with a hollow-stem auger drilling rig to an approximate depth of 40 feet bgs. The boreholes were backfilled with approximately 375 pounds of EHC™ per point and mixed with water to produce EHC™ slurry (approximately 30% solids). Each borehole was capped with bentonite grout and a concrete patch at the surface. MW-48D MW-47D
28 borings
375 lbs ZVI

Treatment Zone Performance

As stated earlier, the existing treatment zone was constructed at the Commerce Center between wells MW-48D (upgradient) and MW-47D (downgradient). This migration pathway through the treatment zone continues through well MW-29D. Prior to, and since the construction of the treatment zone, wells MW-48D, MW-47D, and MW-29 have been sampled on a regular basis. The groundwater samples are analyzed for BHCs. The analytical results for these groundwater samples indicated significant reductions in the total BHC concentrations since April 2009 (refer to Chart 1). 48D → 47D → 29

Changes in BHC Plume Geometry

In October 2009, elevated BHC concentrations were detected in well MW-49D, which is located north of well MW-29D. Prior to this sampling event, the BHC isomer concentrations were below or at the cleanup levels specified in the *Record of Decision* dated May 1996. Following these detections, ARCADIS reviewed the BHC concentrations in wells MW-1D and MW-32D. These two wells lie along a migration pathway that is north and parallel to the pathway through the treatment zone. The BHC concentration data for wells MW-1D, MW-32D, and MW-49D are presented graphically in Chart 2. Most notable is the increase in BHC concentrations in well MW-1D, which is upgradient of the Commerce Center. This increase in BHC concentration suggests a slight change in the BHC plume geometry.

[BHC] in MW-1D

Proposed Expansion of Pilot Test

In order to address the elevated BHC concentrations in the wells along the northern migration pathway (defined by wells MW-50D, MW-1D, MW-32D, and MW-49D), ARCADIS proposes to expand the treatment zone at the Commerce Center and construct a new treatment zone at the Chevron property (Figure 4). The expansion would include 19 additional points at PRB 9.0 (Figure 4) and 15 additional points at PRB 10.0 (Figure 4) constructed with EHC slurry using a method consistent with Work Plan Addendum II. PRB 9.0 would be constructed between MW-32D (upgradient) and MW-49D (downgradient). PRB 10.0 would be constructed downgradient of well MW-50S/D, which has been reported to contain the highest dissolved-phase BHC concentrations. PRB 10.0 would supplement the proposed source reduction activities at the Chevron property.

Northern migration pathway
50D, 1D, 32D, 49D

Expansion
- 19 additional points @ PRB 9.0
- 15 points @ PRB 10.0
- MW-32D → PRB #9 → MW-49D
- MW-50 → PRB #10
→ highest [BHC]

49D & 1D w/ 4-5 m. LWS
- gw [BHC] elevates @ 49D

The proposed construction details for PRB No. 9.0 are summarized in the following table:

PRB # 9.0

Descriptions	PRB No. 9.0
# of Backfill Points	19
Spacing (feet)	5
Begin Backfill (feet bgs)	10
End Backfill (feet bgs)	40
PRB Thickness (feet)	30
Amount of EHC™ per Point (lbs)	315
Amount of Slurry per Point (gal)	150
Amount of EHC™ per foot (lbs)	10.5
Amount of Slurry per foot (gal)	5
Total Amount of EHC™ (lbs)	5,985

The proposed construction details for PRB No. 10.0 are summarized in the following table:

PRB # 10

Descriptions	PRB No. 10.0
# of Backfill Points	15
Spacing (feet)	5
Begin Backfill (feet bgs)	5
End Backfill (feet bgs)	30
PRB Thickness (feet)	25
Amount of EHC™ per Point (lbs)	265
Amount of Slurry per Point (gal)	125
Amount of EHC™ per foot (lbs)	8.75
Amount of Slurry per foot (gal)	4.2
Total Amount of EHC™ (lbs)	3,975

Depending on field conditions and subsequent groundwater monitoring data, minor modifications and/or additions may be warranted.

Performance Monitoring and Reporting

Chevron EMC will continue to collect groundwater samples in accordance with the approved groundwater monitoring program. This program includes the monthly sampling of wells MW-11S, MW-29D, MW-47D, MW-48D, and MW-49D. In addition, a total of 21 wells are sampled on a quarterly basis and 40 wells are sampled on an annual basis. All groundwater samples are analyzed for chlorinated pesticides. Selected groundwater samples are analyzed for TOC.

Monthly sampling
- 45
- 29D
- 47D
- 48D
- 49D

Chevron EMC prepares quarterly site status updates. The site status updates include a summary of the site activities completed during the reporting period and the activities proposed for the subsequent period. In addition, the site status updated includes site plans and historical analytical tables.

*Quarterly - 21 wells
Annual - 40 wells*

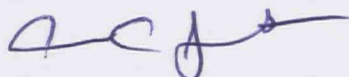
Schedule

Upon receipt of USEPA approval, Chevron EMC is prepared to coordinate and complete the proposed field activities. The USEPA will be notified at least two weeks before the initiation of the field activities.

Please contact me at 714.508.2677 or via e-mail at Allen.Just@arcadis-us.com if you have any questions or need additional information.

Sincerely,

ARCADIS



Allen C. Just, P.E.
Principal Engineer

Copies:

Karen Milicic, FDEP, Tallahassee, FL
Mark Stella, Chevron EMC, Bellaire, TX
Susan Tobin, TASK Environmental, Mount Dora, FL
Matthew Coglianese, Rasco Klock Reininger Perez Esquenazi Vigil & Nieto PL,
Coral Gables, FL

Attachments:

Figure 1	Topographic Map of Site Location and Vicinity
Figure 2	Site Plan
Figure 3	Previously Assumed Preferential Pathway Relative to the Site
Figure 4	Revised Preferential Pathway and Proposed PRG Locations
Chart 1	Total BHC Concentrations in MW-48D, MW-47D, and MW-29D
Chart 2	Total BHC Concentrations in MW-1D, MW-32D, and MW-49D

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Attachments

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Figures

CITY:SYR DIV:GROUP:85 DEKLS LD: AM: PD: TM: TR: LYRON*OFF*REF*
 GACADACTB004531300000001145313802.DWG LAYOUT: 1
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 XREFS: IMAGES: PROJECTNAME: 45313X00
 45313X00



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., ORLANDO WEST, FLORIDA, 1955.

0 2000' 4000'
 Approximate Scale: 1" = 2000'

NOTE: PROPERTY LOCATION
 IS APPROXIMATE ONLY.



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 HOUSTON, TEXAS
CHEVRON ORLANDO SUPERFUND SITE
 ORLANDO, FLORIDA

**TOPOGRAPHIC MAP OF SITE
 LOCATION AND VICINITY**



FIGURE

1



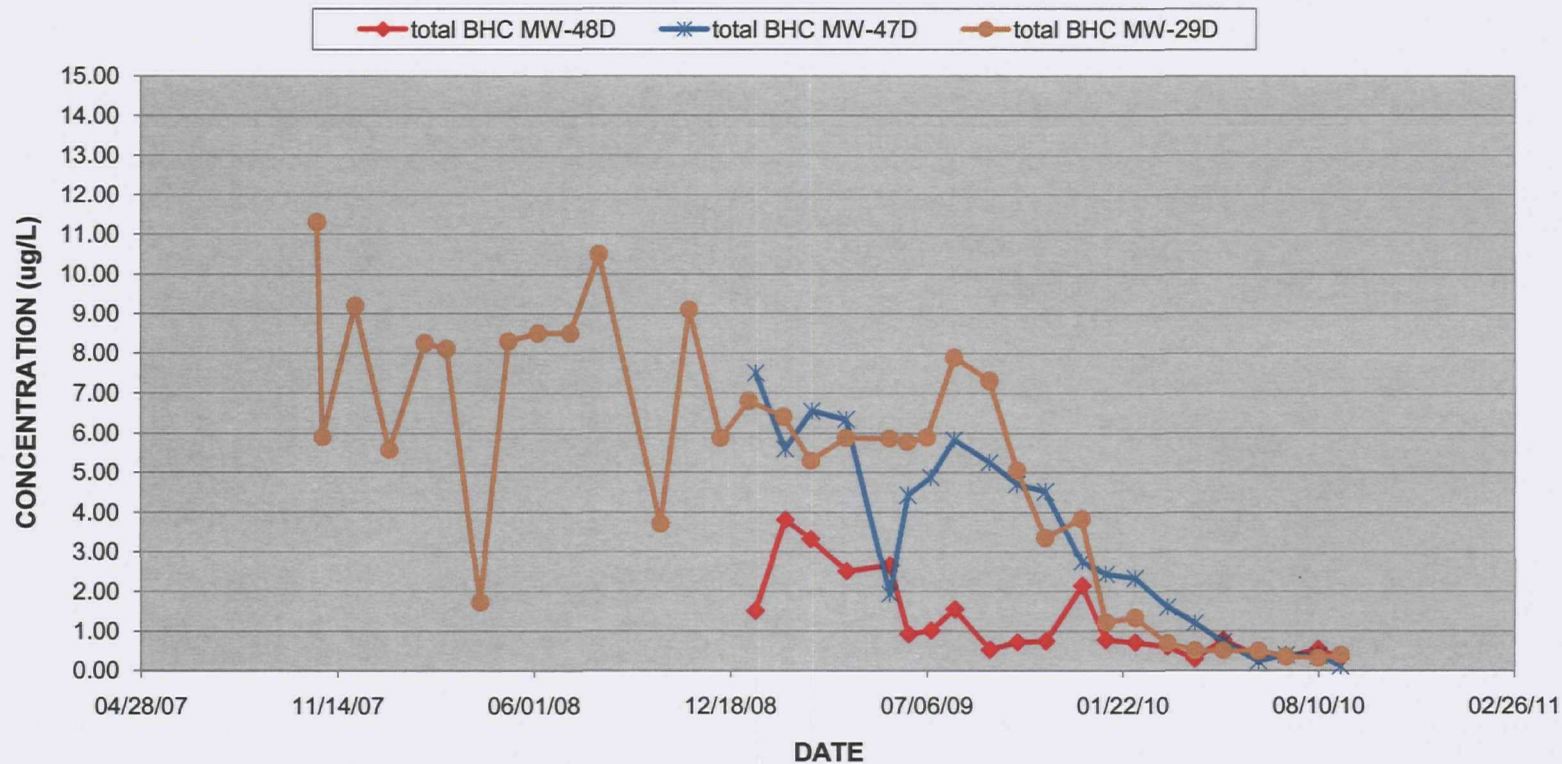




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Charts

TOTAL BHC CONCENTRATIONS IN MW-48D, MW-47D, and MW-29D



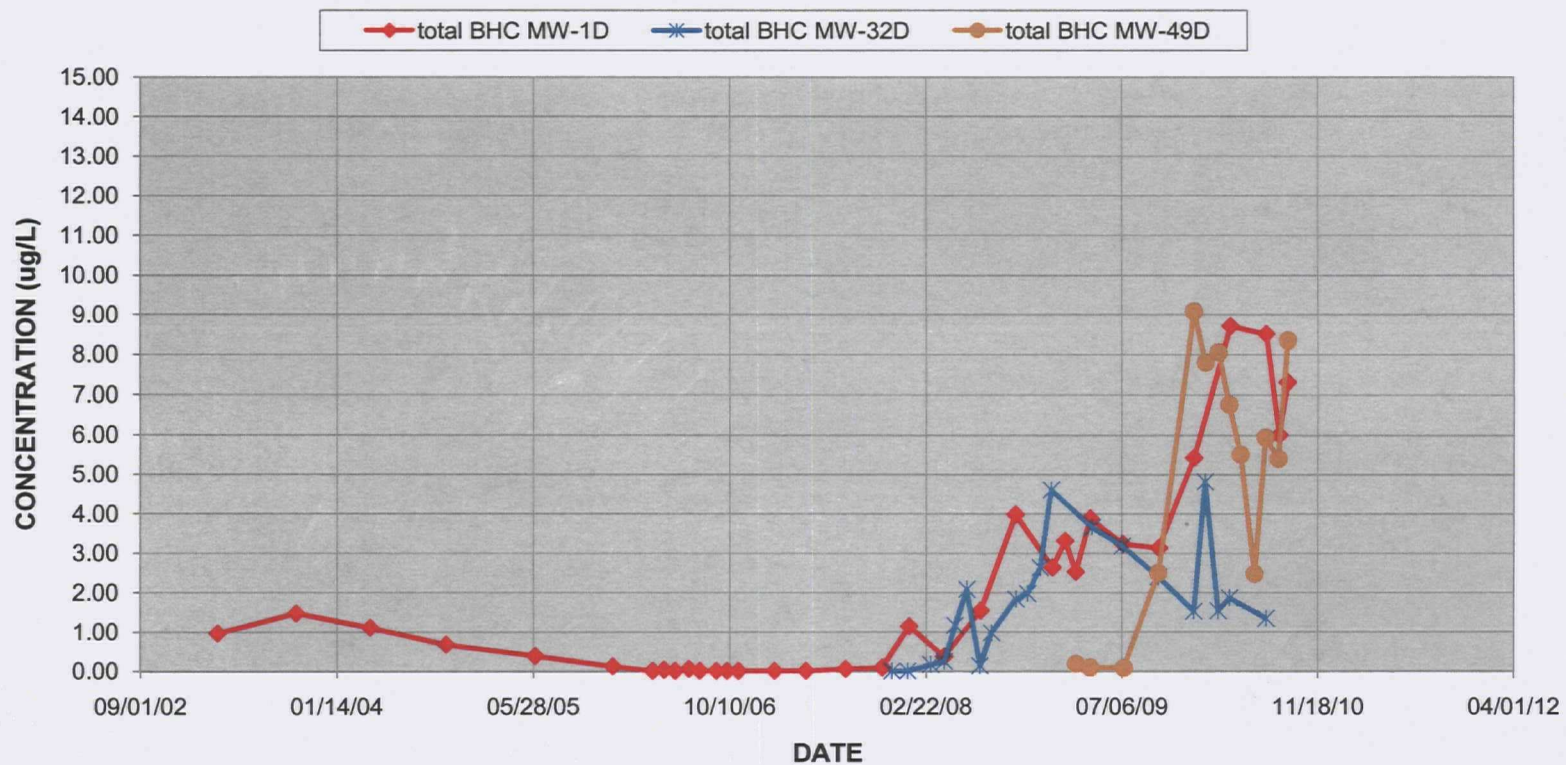
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**TOTAL BHC CONCENTRATIONS IN MONITORING WELLS
MW-48D, MW-47D and MW-29D**



**CHART
1**

TOTAL BHC CONCENTRATIONS IN MW-1D, MW-32D, and MW-49D



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**TOTAL BHC CONCENTRATIONS IN MONITORING WELLS
MW-1D, MW-32D and MW-49D**



**CHART
2**